

**OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
 TITLE V PERMIT REVIEW REPORT**

Owens Corning Fiberglass Corporation
 11910 NW St. Helens Road
 Portland, OR 97231

Unassigned emissions		Special conditions		NESHAP	
Emission credits		Annual report	X	NSR	X
Source test	X	Semi-annual report	X	PSD	X
COMS	X	Quarterly report		RACT	
CEMS		Monthly report		Size	T-V
CAM		Excess emissions report		Major HAP source	
Ambient monitoring		NSPS	X	Federal major source	X
Compliance schedule					

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INTRODUCTION

1. PERMIT ACTION SUMMARY: The proposed permit action is a renewal of an existing Title V permit 26-3067 that is scheduled to expire on December 1, 2006. In addition to the existing Title V permit that the permittee is operating under, in accordance with OAR 340-224-0010(2), the Department also issued an Air Contaminant Discharge Permit (ACDP) to Owens Corning on 01/03/2002 for a major modification that triggered New Source Review (NSR). The proposed Title V permit renewal incorporates all of the applicable requirements of ACDP through an administrative permit amendment process in accordance with OAR 340-218-0150(h).
2. In accordance with OAR 340-218-0120(1)(f), this review report is intended to provide the legal and factual basis for the draft permit conditions. In most cases, the legal basis for a permit condition is included in the permit by citing the applicable regulation. In addition, the factual basis for the requirement may be the same as the legal basis. However, when the regulation is not specific and only provides general requirements, this review report intends to provide a more thorough explanation of the factual basis for the draft permit conditions.
3. Off-permit changes and administrative amendments that occurred during the permit term include the following:
 - a. Installed a heat exchanger at the I-1 outlet to recover the heat that was previously wasted. This process-upgrade uses less fuel and subsequently less emission.
 - b. The soot blow-down operations that were manually performed have been automated for efficiency.
 - c. Fume incinerator (I-1) in place of RTO now controls VOC emissions from various EU4 through EU7 devices. The RTO now function as a back-up unit.
 - d. The facility site and mailing address is 11910 NW St. Helens Road, Portland, OR 97231.
 - e. The position title of responsible official has been changed from "Operations Manager" to "Plant Leader."
 - f. Tank No.53 (EU6.2) has been renamed to "Dryer Tank."
 - g. Condition 12 has been modified to include all EU5 tanks except EU5.4.
 - h. The EU3.3 Tank has been removed. Therefore condition 15 omits a reference made to EU3.3 Tank. In addition, condition 15 has been amended to accurately reflect the NSPS recordkeeping requirements of 40 CFR 60.110b and 60.116b.
 - i. "Non-Applicable Requirements" section of the permit has been corrected as necessary and updated to reflect the rule number changes.
4. Pursuant to OAR 340-218-150, the PSD and BACT Conditions established in the existing 01/03/2002 ACDP 26-3067 are reorganized in the proposed Title V permit as follow:
 - a. The daily PSD limit of 528 lbs of SO₂/day and the daily NSR limit of 1,143 lbs of CO/day will continue to remain in the PSEL section to the permit.
 - b. Condition 13.d of the existing 01/03/2002 ACDP 26-3067 specify the minimum combustion temperature and residence time of the incinerator (I-1) and its back-up thermal oxidizer (RTO-1). The proposed Title V permit re-organizes the BACT condition applicable to I-1 in the separate section (Condition 19) of the permit. See item 17 of this review report for the BACT review for CO emissions.
5. On May 22, 2006, Owens Corning submitted Notice of Intent to Construct a new "Scotch Marine Dryback 300 Series" boiler with a heat input capacity of 8.4 MMBtu/hr. The boiler will provide non-contact heating to material storage and transport equipment. No emission increase above the exiting PSEL is proposed. The boiler does not trigger NSPS (subpart Dc) because its capacity is less than 10 MMBtu/hr.

The permit identifies the boiler as EU2.5.

PERMITTEE IDENTIFICATION

- Owens Corning Fiberglas Corporation owns and operates an asphalt blowing plant in Portland Oregon, producing various grades of asphalt and asphaltic mixture for paving, residential and commercial roofing, and for industrial use. The facility occupies approximately 44.3 acres of property located at 11910 NW St. Helens Road. Mr. Frank Burg is the plant leader and he is currently identified as the primary responsible official for the permitted activities.

FACILITY/PROCESS DESCRIPTION

- Preparation of the asphalt is an integral part of the production of asphalt roofing and paving materials. The preparation step includes "blowing", which oxidizes asphalt by bubbling air through the liquid-asphalt (flux) at elevated temperature for a set period. The blowing time depends on the desired characteristics of the asphalt product, such as softening point and penetration rate. The finished asphalt products are shipped offsite either in hot-bulk (liquid) form or the cooled/solidified packages.

Marine vessels, rail cars, and tanker trucks deliver the raw material (flux) directly into the process storage tanks that are insulated to minimize heat loss. The process heater, hot oil coils and/or steam coils inside the storage tank provide heat to the asphalt materials to maintain the liquid phase (flux). From storage tanks, flux is either directly pumped into the convertor or routed through a direct fired non-contact preheater (EU1.5). Positive displacement blowers inject air into the convertor, which disperses air using numerous piping and baffles and by mechanical agitation. The oxidation that occurs in the convertor is an exothermic reaction, and the excess heat is controlled (cooled) by open water jackets. For fire prevention, steam can be injected into the convertor vapor space or into the fume system at any time. Inorganic salts such as ferric chloride (FeCl_3) can be used as catalyst to achieve desired properties, and to speed up the reaction time in the convertor. The finished batch is either pumped into the product storage tanks or directly loaded into the truck for immediate shipment. The convertors are capable of running at a batch, semi-continuous or continuous mode.

The air blown into convertor strips off the light hydrocarbons in the flux, and the stripped asphalt fumes are exhausted into the knockout tank where heavier gases are condensed into liquid (blowing distillate oil) and pumped into the EU6 storage tank. Blowing distillate (BD) oil or cutterstock is similar to #5 residual oil and it is a marketable commodity. The lighter gases that did not condense in the knockout tank are routed to the fume incinerator (I-1) for combustion/destruction. Vapors collected from product storage tanks and loading racks are routed to I-1 for incineration. Natural gas is the primary fuel for incinerator (EU1.5 preheater), hot oil heater (EU2.1), and the boilers (EU2.2 and EU2.5) that generate process steam. These fuel burning equipment are capable of burning oil as a back-up fuel during the natural gas curtailment period.

Emissions from the asphalt blowing processes primarily consist of particulate matter (PM) and volatile organic compounds (VOC). The auxiliary fuel combustion equipment such as preheater, hot oil heater, and boilers generate the usual combustion by-products PM_{10} , CO, SO_2 , NO_x , and VOC. Except for the EU3 tanks, the VOC emissions collected from all other storage tanks and the loading racks are routed to the incinerator (I-1) or a back-up unit RTO for thermal destruction. The PM emissions from all storage tanks including EU3 and loading racks are controlled by fiber bed filters.

- Operating Scenario: Owens Corning identified three operating scenarios under which the asphalt flux will be processed: The base operating scenario OS#1 does not utilize any catalyst, the alternative operating scenario OS#2 uses ferric chloride (FeCl_3) based catalyst, and the alternative operating scenario OS#3 utilizes caustic and metal catalyst for the purpose of reducing SO_2 emissions during the asphalt blowing operations.

The PM emissions from the emissions unit EU1 are subject to the NSPS standard (40 CFR 60.472(b)(1)) of 0.67 kg of PM per Mg of asphalt charged, when (FeCl₃ or caustic/metal) catalyst is added to the still under OS#2 or OS#3. Under the base operating scenario OS#1 that does not use catalyst, the PM emissions from EU1 becomes subject to the more stringent NSPS standard (40 CFR 60.472(b)(3)) of 0.60 kg/Mg of asphalt charged. All other applicable requirements and the associated monitoring in this Title V permit are the same for all operating scenarios identified.

EMISSIONS UNIT (EU) AND POLLUTION CONTROL DEVICE (PCD) IDENTIFICATION

9. Emissions units identified in this permit are grouped primarily with respect to the common applicable requirements and the associated (common) monitoring protocols, and they are grouped as follow:

EU ID	EU Devices	EU Device ID	POLLUTION CONTROL DEVICE	PCD ID
EU1	Convertor #1	EU1.1	Fume Incinerator & RTO back-up	I-1 (RTO)
	Convertor #2	EU1.2		
	Convertor #3	EU1.3		
	Convertor #4	EU1.4		
	Preheater	EU1.5**	None	--
EU2	Hot Oil Heater	EU2.1	None	--
	Boiler	EU2.3	None	--
	Preheater	EU2.4	None	--
	Boiler (8.4 MMBtu/hr)	EU2.5	None	--
EU3	Tank #1 (3.4 MMgal)	EU3.1	Fiber bed filter	F-1
	Tank #2 (3.4 MMgal)	EU3.2	Fiber bed filter	F-2
EU4	Tank #3 (169 Mgal)	EU4.1	Fume Incinerator & RTO back-up	I-1 (RTO)
	Tank #4 (110 Mgal)	EU4.2		
	Tank #5 (110 Mgal)	EU4.3		
	Tank #6 (110 Mgal)	EU4.4		
	accessory tank (10 ³ gal)	EU4.5		
EU5	Tank #7 (170 Mgal)	EU5.1	Fume Incinerator & RTO back-up	I-1 (RTO)
	Tank #8 (30 Mgal)	EU5.2		
	Tank #9 (60 Mgal)	EU5.3		
	Tank #10 (12 Mgal)	EU5.4		
	Tank #12 (30 Mgal)	EU5.5		
	Tank #13 (30 Mgal)	EU5.6		
	Tank #14 (27 Mgal)	EU5.7		
	Tank #15 (32 Mgal)	EU5.8		
	Tank #16 (32 Mgal)	EU5.9		
Tank #17 (32 Mgal)	EU5.10			
EU6	Tank #51 (22 Mgal)	EU6.1	Fume Incinerator & RTO back-up	I-1 (RTO)
	Dryer Tank (0.4 Mgal)	EU6.2		
EU7	Truck Loading Rack #1	EU7.1	Fume Incinerator & RTO back-up	I-1 (RTO)
	Truck Loading Rack #2	EU7.2		
	Truck Loading Rack #3	EU7.3	Fiber bed filters	FL-1 to FL-4
	Truck Loading Rack #4	EU7.4		
EU8	Pouring Shed	EU8.1	None	--

** The non-contact preheater EU1.5 is also the incinerator (I-1) that controls VOC emissions from numerous sources identified.

Emissions Unit 1 (EU1) consists of convertor #1(EU1.1) through #4(EU1.4), and the preheater (EU1.5) that also act as incinerator (I-1). The asphalt flux is either directly pumped into the convertor or through the non-contact preheater. Only one convertor (and knock-out tank) is operated at a time. Gaseous (VOC) emissions from convertor are routed to the preheater (EU1.5) for incineration. The preheater also controls VOC/PM₁₀ emissions from the EU7 truck loading racks, and the asphalt vapors/fumes collected from all the storage tanks, excluding EU3. Flue gases from the incinerator I-1 (i.e., Preheater EU1.5) are also utilized to (non-contact) heat the asphalt materials.

Emissions Unit 2 (EU2) includes a hot oil heater (EU2.1) manufactured by Uniflux, Inc., and the boilers and a preheater. The EU2.2 boiler manufactured by York-Shipley, Inc. was removed and replaced by the EU2.3 boiler. The EU2.1 hot oil heater and EU2.3 boiler provide (heat) energy required to keep materials inside storage tanks fluid and transportable. The capacity of EU2.1 hot oil heater is less than 10 MMBtu/hr and it was installed before 6/09/1989. The EU2.3 boiler with the capacity of 16.8×10^6 Btu/hr was manufactured in 1973 and it was modified in 1988. The EU2.5 boiler is "Scotch Marine Dryback Series" with a heat input capacity of 8.4 MMBtu/hr, capable of burning natural gas only. All of the EU2 fuel burning equipment is exempt from the requirements of 40 CFR, subpart Dc.

Emissions Unit 3 (EU3) now consists of two fixed roof storage tanks EU3.1 (Tank #1) and EU3.2 (Tank #2). The EU3 storage tanks typically stores asphalt raw materials with vapor pressure of less than 0.15 psi at stored temperature of about 320 degrees Fahrenheit (°F).

Emissions Unit 4 (EU4) consists of four fixed roof storage tanks EU4.1 (Tank #3), EU4.2 (Tank #4), EU4.3 (Tank #5), and EU4.4 (Tank #6), and a small (1,040 gallon) fixed roof accessory tank EU4.5. Storage tanks EU4.1 through EU4.4 store finished asphalt products with vapor pressure of less than 0.75 psi at stored temperature of 420°F. The small (1,040 gallon) accessory tank EU4.5 is generally maintained at about 300°F.

Emissions Unit 5 (EU5) consists of ten fixed roof storage tanks numbered EU5.1 through EU5.10. No products with the vapor pressure greater than 15 kPa (2.2 psi) would be stored in EU5.4 (Tank #10), and it is exempt from the general provisions of NSPS-subpart Kb requirements per 40 CFR 60.110b(c). However, the EU5.4 tank is subject to the recordkeeping requirements of 40 CFR 60.116b(a) and (b). All other EU5 storage tanks are permitted to store products with a vapor pressure greater than 3.5 kPa (0.5 psi), and therefore these tanks are subject to the general provisions of subpart Kb.

Emissions Unit 6 (EU6) consists of two fixed roof storage tanks EU6.1 (Tank #51) and EU6.2 (Dryer Tank) dedicated to storing blowing distillate (BD) oil from the knockout tank. None of the fuel burning equipment at the permitted facility burn BD oil, which is shipped offsite. The vapor pressure of BD oils average less than 0.05 psi.

Emissions Unit 7 (EU7) represents 4 asphalt loading racks, EU7.1 through EU7.4. The loading rack EU7.1 was installed in June of 1982, and EU7.2 was installed in February of 1993. The EU7.3 and EU7.4 loading racks were installed in later dates. Emissions from all loading racks are controlled by the fume incinerator (I-1) and/or the fiber bed filters.

Emissions Unit 8 (EU8) represents a pouring shed.

Fugitive Emission Source: The pipe transport systems contain numerous valves, flanges, pumps, sampling ports, and other components through which the VOC vapor escapes. The permittee estimated approximately 100 valves, 280 connectors, and 8 pumps when original Title V permit application was submitted. The estimated VOC emissions from these fugitive components are less than 0.2 tons per year, and they are included in the aggregate insignificant emissions. For the purpose of estimating the

VOC emissions, emissions factors published by American Petroleum Institute (API), Publication No. 4588 (5/93), Table A, were used:

Component ("i") Type	Number of Component "i"	Average Emission Factor, EF _i (lbs/hr-component)
Valves	100	1.5 x 10 ⁻⁴
Connectors	280	2.3 x 10 ⁻⁵
Pumps (seals)	8	9.3 x 10 ⁻⁴

10. Emissions from convertors EU1.1 to EU1.4 are directly routed to the fume incinerator (I-1) which is also identified in the permit as the preheater EU1.5. Gaseous emissions from the EU4 and EU5 storage tanks pass through a fiber bed filter prior to being routed to I-1 (EU1.5) for incineration. The PM/VOC emissions from the EU7 loading racks are also screened (PM) by fiber bed filters prior to being incinerated. Emissions from each of the EU3 storage tanks are passed through a fiber bed filter only. All Pollution Control Devices (PCD) existing at the facility are listed in the table below. Fiber bed filters with prefix "F" are designed to treat 100 scfm of gas flow, whereas fiber bed filters with prefix "FL" are designed to treat 600 scfm of gas flow:

POLLUTION CONTROL DEVICE	PCD ID	EU Controlled	Rated Efficiency
Fume Incinerator & RTO back-up	I-1 (RTO)	EU4, EU5, EU6 and EU7	98% PM/VOC @ 33,659 acfm, 1,550°F, 0.5 sec.
Fiber bed filter	F-1	EU3.1	95% PM
Fiber bed filter	F-2	EU3.2	95% PM
Fiber bed filter	F-11	EU3.3	95% PM
Fiber bed filter	F-3	EU4.1	95% PM
Fiber bed filter	F-4	EU4.2	95% PM
Fiber bed filter	F-5	EU4.3	95% PM
Fiber bed filter	F-6	EU4.4	95% PM
Fiber bed filter	F-7	EU5.1	95% PM
Fiber bed filter	F-8	EU5.2	95% PM
Fiber bed filter	F-9	EU5.3	95% PM
Fiber bed filter	F-10	EU5.4	95% PM
Fiber bed filter	F-51	EU6.1	95% PM
Fiber bed filter	FL-1	EU7.1	95% PM
Fiber bed filter	FL-2	EU7.2	95% PM
Fiber bed filter	FL-3	EU7.3	95% PM
Fiber bed filter	FL-4	EU7.4	95% PM

The incinerator (I-1) is the main source of plant site emissions. Gases from convertors and storage tanks, in addition to solvent vapor released during the truck loading operations, are collected and routed to I-1 for thermal destruction prior to discharge into the atmosphere. For the purpose of (PSEL) emissions monitoring, emissions from I-1 (aka. EU1.5) includes emissions from EU4 and EU6 storage tanks and the EU7 loading racks.

11. The permittee has identified the following categorically insignificant activities:
- Evaporative and tail pipe emissions from on-site motor vehicle operation
 - Distillate oil, kerosene, and gasoline fuel burning equipment rated at less than or equal to 0.4 million Btu/hr
 - Natural gas and propane burning equipment rated at less than or equal to 2.0 million Btu/hr
 - Office activities
 - Janitorial activities
 - Groundskeeping activities including, but not limited to building painting and road and parking lot maintenance
 - Instrument calibration
 - Maintenance and repair shop
 - Air cooling or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment
 - Bench scale laboratory equipment and laboratory equipment used exclusively for chemical and physical analysis, including associated vacuum producing devices but excluding research and development facilities
 - Temporary construction activities
 - Warehouse activities
 - Accidental fires
 - Air vents from air compressors
 - Fire Brigade training
 - Instrument air dryers and distribution
 - Routine maintenance, repair, and replacement such as anticipated activities most often associated with and performed during regularly scheduled equipment outages to maintain a plant and its equipment in good operating condition, including but not limited to steam cleaning, abrasive use, and woodworking
 - Electric motors
 - Storage tanks, reservoirs, transfer and lubricating equipment used for ASTM grade distillate or residual fuels, lubricants, and hydraulic fluids
 - On-site storage tanks not subject to any New Source Performance Standards (NSPS), including underground storage tanks (UST), storing gasoline or diesel used exclusively for fueling of the facility's fleet of vehicles
 - Natural gas, propane, and liquefied petroleum gas (LPG) storage tanks and transfer equipment
 - Emissions from wastewater discharges to publicly owned treatment works (POTW) provided the source is authorized to discharge to the POTW, not including on-site wastewater treatment and/or holding facilities
 - Fire suppression and training
 - Paved roads and paved parking lots within an urban growth boundary
 - Health, safety, and emergency response activities
 - Emergency generators and pumps used only during loss of primary equipment or utility service
 - Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems
 - Non-contact steam vents on condensate receivers, deaerators and similar equipment
 - Oil/water separators in effluent treatment systems
 - Combustion source flame safety purging on startup

EMISSION LIMITS AND STANDARDS

12. Facility-wide applicable requirements
- a. The nuisance control requirements, OAR 340-208-0300, state-only enforceable
 - b. the storage tank equipment specifications, OAR 340-208-0560, state-only enforceable

13. Emissions Unit specific NSPS Requirements

- a. The NSPS particulate matter (PM) limits of 40 CFR 60.472(b) (1) and (3) are applicable to EU1. The 0.67 kg/Mg limit (0.67 kg of PM per Mg of asphalt charged) applies when FeCl₃ or caustic/metal catalyst is added to the still under OS#2 or OS#3. The 0.60 kg/Mg limit is applicable to the base operating scenario OS#1 in which no catalyst is added.
- b. The zero percent opacity standards, 40 CFR 60.472(b)(5) and (c), are applicable to emissions units EU1, EU3, EU4, and EU5.
- c. A closed vent system and the 95% VOC control requirements are applicable to all EU tanks except EU5.4 tank, 40 CFR 60.112b (a)(3).
- d. The NSPS recordkeeping requirements of 40 CFR 60.116b (a) and (b) are applicable if the vapor pressure of stored products are increased to the level(s) specified in the rules, and the potential exists.

14. NSPS Applicability Discussion

- a. Storage tanks EU3.1, EU3.2, and EU4.1 through EU4.5 were installed after May 18, 1978 and prior to July 23, 1984, but they are excluded from the NSPS requirements of 40 CFR, Subpart Ka, because of low vapor pressure of stored products. In addition, the storage capacity of EU4.5 tank is less than the NSPS - Ka cut off limit of 40,000 gallons.
- b. The EU5.4 tank has the storage capacity of 29,500 gallons (< 151 m³) and stores products with vapor pressures less than 15.0 kPa (2.2 psi), and therefore it is excluded from the General Provisions (Part 60, subpart A) and the provisions of subpart Kb.
- c. The EU4.5 accessory tank and the EU6.2 dryer tank with the capacity less than 40 m³ (10.6 Mgal) are exempt from all NSPS requirements including the recordkeeping requirements of part 60.116b (a) and (b).
- d. Recordkeeping requirements specified in 40 CFR 60.116b (a) and (b) are the (conditional) NSPS recordkeeping requirements applicable to storage tanks if the vapor pressure of volatile organic liquid (VOL) stored exceed the level specified in the permit.
- e. Although EU5 storage tanks are generally used to store products with the average vapor pressure of 0.12 psi, these tanks need to have the ability to store compounds with higher vapor pressure (> 0.5 psi), and therefore EU5 storage tanks except EU5.4 are subject to the provisions of Subpart Kb, as outlined in the permit. All storage tanks at the plant site would be used to store products with vapor pressure less than 1.52 psi, and they are excluded from the RACT requirements of OAR 340-22-160 (Subparts K and Ka).
- f. Regardless of the NSPS non-applicability status of storage tanks, a closed vent system and control device (I-1) controls emissions from all EU5 storage tanks at a level equivalent to the NSPS requirements specified in 40 CFR 60.112b (a)(3) or (b)(1). Also, note that storage tanks are taken out of service at regular interval for maintenance. Tanks and connecting pipelines at the plant can be cleaned by purging with steam at full line pressure. No one storage tank is dedicated to one type of product, and materials stored in a specific tank may change during the terms of the proposed permit. However, the permittee shall not begin processing new asphaltic products with the (high) vapor pressure (at stored temperature) that would trigger the RACT or NSPS requirements, without first notifying the Department for permit modification process (see General Conditions section of the permit).

15. Emissions Unit specific (non-NSPS) Standards

- a. The 20% opacity standards of OAR 340-208-0110 and 340-208-0600;
- b. grain loading limits of OAR 340-228-0210(1)(b) and 340-226-0210(1)(b);
- c. operating temperature limits applicable to I-1, OAR 340-226-0120(1) and 340-208-0550;
- d. the fuel oil sulfur contents, OAR 340-228-0110; and
- e. the 1000 ppm sulfur dioxide emission standard, state-only enforceable, OAR 340-208-0630.

16. Emissions limits applicable to Insignificant Activities

The opacity limit (OAR 340-208-0600) and grain loading limit (OAR 340-228-0210(1)(b)) applicable to fuel-burning equipment and (340-226-0210) non-fuel burning equipment, the fugitive particulate emissions limit of OAR 340-208-0210(2), fugitive dust control requirements of OAR 340-208-0210 and -0620, and the (Portland-area specific) architectural coating standards (OAR 340-242-0730 to 0750 are all applicable to insignificant activities.

17. Best Available Control Technology for CO Emissions from I-1

- a. Best Available Control Technology (BACT) in general must not be less stringent than the level of control required by any applicable NSPS or NESHAP. Owens Corning is a minor source of HAP and no NESHAP is required. However, 40 CFR Part 60 - subpart UU is applicable for PM control, and subpart Kb is applicable for VOC control. Thermal oxidation control technology that Owens Corning utilizes has been accepted by NSPS-subparts UU and Kb as state-of-the-art control for PM and VOC emissions. Owens Corning uses Fume Incinerator (I-1) to control PM/VOC emissions from blowing stills and Regenerative Thermal Oxidizer (RTO, I-1 backup, Electric) to control VOC emissions from storage tanks when I-1 is down.
- b. Exhaust from (EU1.1 through EU1.4) blowing stills is vented to knockout tanks for the removal of condensable VOC. The exhaust from knockout tanks is then vented to a Fume-Incinerator I-1 to meet the NSPS subpart UU requirements for particulate control. Thermal oxidation has been defined as state-of-the-art control for PM/VOC emissions, but carbon monoxide is also formed due to incomplete combustion.
- c. Increased Incineration Temperature: Owens Corning determined that the most effective method of reducing CO from I-1 was increasing the combustion temperature from 1450 degrees F to 1550 degrees F. The I-1 combustion temperature of 1550 °F is optimal based on the fact that other air pollutants are produced at higher temperature. The BACT requirements for controlling CO include maintaining the I-1 combustion temperature at 1550 °F.
- d. Optimizing Other Combustion Parameters: Owens Corning determined the residence time in the combustion chamber needs to be longer than 0.75 seconds in order to obtain proper combustion of a waste gas stream. Along with the proper residence time, the optimum excess air must be maintained in order to obtain proper combustion. Each burner's optimum excess air requirement varies based on the burner configuration and also depends on type of fuel (e.g., fuel oil or natural gas) combusted. The optimization of these parameters are readily determined and maintained by the I-1 computer system (software). The BACT requirements for controlling CO include maintaining the minimum residence time of 0.75 seconds in the I-1 combustion chamber.

PLANT SITE EMISSION LIMITS

18. Provided below is a summary of the baseline emissions rate, netting basis, and plant site emission limits.

Pollutant	Baseline Emission Rate (tons/yr)	Netting Basis		Plant Site Emission Limit (PSEL)		
		Previous (tons/yr)	Proposed (tons/yr)	Previous PSEL (tons/yr)	Proposed PSEL (tons/yr)	PSEL Increase (tons/yr)
PM	0	0	0	24	24	0
PM ₁₀	0	0	0	14	14	0
SO ₂	0	106	106	106	106	0
NO _x	0	0	0	39	39	0
CO	0	157	157	157	157	0
VOC	0	0	0	39	39	0
H ₂ S	0	0	0	--	9	--

- a. The facility was partially built in 1981 but the construction was not completed until December of 1992. The baseline emission rate for this facility is set equal to zero for all regulated criteria pollutants.
- b. The netting basis is zero for regulated air pollutants PM, PM₁₀, NO_x, VOC, and H₂S, which all have the generic PSEL.
- c. The netting basis is 106 tons for SO₂. The first Title-V Permit issued on September 10, 1997 increased the SO₂ PSEL above the SO₂ SER of 39 tons/yr. Pursuant to OAR 340-222-0041(3)(b) (C), Owens Corning conducted an ambient air quality modeling analysis. The modeling analysis concluded that the short-term SO₂ of 528 lbs/day meets the 24-hr average Class II PSD increment, and the Department granted the increase in SO₂ PSEL.
- d. The netting basis is 157 tons for CO. The permit issued on January 3, 2002 increased the CO PSEL above the CO SER of 99 tons/yr. Pursuant to OAR 340-222-0041(3)(B)(iii), Owens Corning has demonstrated that the increase in CO emissions will not cause or contribute to an air quality impact equal to or greater than 0.5 mg/m³ (8-hour average) and 2 mg/m³ (1-hour average). In a carbon monoxide maintenance area, a proposed carbon monoxide major source or major modification is exempt from the “offset and “growth allowance” if the source can demonstrate that the source or modification will not cause or contribute to an air quality impact equal to or greater than 0.5 mg/m³ (8 hour average) and 2 mg/m³ (1-hour average). [OAR 340-226-0060 (2)(c), eff 06/01/2001] In accordance with procedures outlined in OAR 340-224-0060, the CO PSEL increase was approved. The results of the modeling show that CO impacts from the modification to the permitted facility are less than the SILs, and thus well within the National Ambient Air Quality Standard (NAAQS) for CO. Pre or post construction monitoring for CO was not required. Analysis of impacts in Class 1 areas was not required. As discussed in item 17 of this review report, Owens Corning is providing the BACT level control to reduce CO emissions from I-1.
- e. H₂S is a regulated pollutant listed in Table 2 of OAR 340-200-0020, and the PSEL must be established for all regulated pollutants that are emitted above their respective de-minimis level. The de-minimis level for H₂S is 1 ton/yr, and Owens Corning emits about 2 tons of H₂S annually. The previous permits issued to Owens Corning did not include the H₂S PSEL.

19. Significant Emission Rate

The PSEL increase over the netting basis is less than the Significant Emission Rate (SER) for all pollutants as defined in OAR 340-0200-0020. Therefore, no further air quality analysis is required in this permit renewal.

Pollutant	Netting Basis (tons/yr)	Current PSEL (tons/yr)	Proposed PSEL (tons/yr)	Increase over Netting Basis (tons/yr)	SER (tons/yr)
PM	0	24	24	0	25
PM ₁₀	0	14	14	0	15
SO ₂	106	106	106	0	40
NO _x	0	39	39	0	40
CO	157	157	157	0	100
VOC	0	39	39	0	40
H ₂ S	0	**	9	**	10

** Owens Corning always had H₂S emissions, and the proposed H₂S PSEL is not an increase in plant site emissions but a correction pursuant to OAR 340-222-0043.

20. Short-Term PSEL

- a. Short-term PSEL: Pursuant to OAR 340-222-0042, no short-term PSELs are established in the permit for all regulated pollutants other than SO₂ and CO.
- b. Short-term (daily) SO₂ PSEL: The existing daily SO₂ PSEL of 528 lbs/day for emissions unit No. 1 (EU1) is retained in the proposed permit. The previous PSD modeling analysis determined that the daily limit of 528 lbs/day meets the 24-hour average Class II PSD increment.
- c. Short-term (daily) CO PSEL: The PSD modeling analysis conducted by the Department determined that short-term emission rate for CO from EU1 cannot exceed 47.62 lbs/hr. This rate does not exceed the Significant Impact Level for CO for the 1-hour and 8-hour averaging periods. This permit review determined the daily averaging in lieu of hourly is practical for the purpose of compliance assurance. Therefore the daily CO PSEL of (47.62 * 24) 1143 lbs/day is established for EU1. The EU1 convertors/preheater is the single largest CO emission source existing at the facility, which account for approximately 97% of the total plant site CO emissions. The short-term daily PSEL is set for EU1 only.

21. Aggregate Insignificant Emissions

The aggregate insignificant activities originally identified by the permittee include the following:

Aggregate Insignificant Activities	Pollutant	Estimated emissions (tons/yr)
Emissions from Tank #60 which contains hot oil	VOC	< 0.2
Emissions from unpaved roads within the plant	PM	0.48
	PM ₁₀	0.22
(EU1) lead emissions	Pb	< 0.01

This permit does not intend to limit "aggregate insignificant activities" to only those currently identified in the permit application. No groups of activities are identified in this permit just for the purpose of identifying insignificant activities, which tend to be a moving target. Instead, the permit aggregate limits

reflect the rule limits, as defined in OAR 340-028-0110 (5). The rules allow the permittee to add more categorical insignificant activities to their existing list, and similarly, the permittee is free to add more insignificant activities to their existing aggregate source list, provided the aggregate emissions of any individual (regulated) pollutant do not exceed the permit (rule) aggregate insignificant limit.

HAZARDOUS AIR POLLUTANTS

22. The Owens Corning facility is a minor source of hazardous air pollutants (HAPs) because the estimated emissions of all individual HAP is less than the 10 tons/yr threshold and the aggregate HAPs emission is less than the 25 tons/yr threshold. Emissions Detail Sheets at the end of this review report provides a complete list of HAPs and detail calculation of HAP emissions.

23. Toxic and Flammable Substance Usage for Accidental Release Prevention

Other than vinyl acetate and styrene, the individual amount of all toxic and flammable substances used at the permitted facility is insignificant:

CAS Number	Chemical Name	Estimated Usage (lbs/yr)			
		INSIGNIFICANT	1,001 - 10,000	10,001 - 20,000	> 50,000
108054	Vinyl Acetate				X
106990	Butadiene	X			
100425	Styrene			X	
7439921	Lead	X			
7440360	Antimony	X			
7440382	Arsenic	X			
7440393	Barium	X			
7440417	Beryllium	X			
7440439	Cadmium	X			
7440473	Chromium	X			
7440484	Cobalt	X			
7440508	Copper	X			
7439965	Manganese	X			
7440020	Nickel	X			
7723140	Phosphorus	X			
7782492	Selenium	X			
7440224	Silver	X			
7440280	Thallium	X			
7440666	Zinc	X			

91203	Naphthalene	X			
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24. Stratospheric Ozone Depleting Substances

The permittee does not use any of the listed ozone depleting substances, and the permittee is exempt from the federal requirements of 40 CFR Part 82, Subpart E; The Labeling of Products Using Ozone-depleting Products. Service on motor (fleet) vehicles is not performed at the plant site, and the permittee does not handle any refrigerants in the motor vehicle air conditioner (MVAC). Therefore the permit omits the applicable requirements specified in 40 CFR Part 82, Subpart B; Servicing of Motor Vehicle Air Conditioners.

MONITORING REQUIREMENTS

Section 70.6(a)(3)(i) requires that all monitoring and analysis procedures or test methods required under applicable requirements be contained in Title V permits. In addition, where the applicable requirement does not require periodic testing or monitoring, periodic monitoring must be prescribed that is sufficient to yield reliable data from the relevant time period that is representative of the source's compliance with the permit. The requirement to include in a permit testing, monitoring, recordkeeping, reporting, and compliance certification sufficient to assure compliance does not require the permit to impose the same level of rigor with respect to all emissions units and applicable requirement situations. It does not require extensive testing or monitoring to assure compliance with the applicable requirements for emissions units that do not have significant potential to violate emission limitations or other requirements under normal operating conditions. Where compliance with the underlying applicable requirement for an insignificant emission unit is not threatened by a lack of a regular program of monitoring and where periodic testing or monitoring is not otherwise required by the applicable requirement, then in this instance, the status quo (i.e., **no monitoring**) will meet section 70.6(a)(3)(i).

25. Facility-wide monitoring associated with the asphalt blowing operations include complaint investigation as need arises, and the periodic inspection to ensure the facility-wide limits set forth in permit are being met.

26. Emissions unit specific monitoring section contains the monitoring related to the grain loading and opacity standards applicable to emissions units identified. The monitoring protocols for the opacity and grain loading limits in this section are established in a progressive manner. Periodic monitoring requirements start with frequent periodic opacity readings, and accumulated results are used to establish the next level (frequency) of monitoring for each individual source of emissions. This progressive monitoring directs resources toward the potential problem sources, rather than equally distributing over emission sources regardless of their compliance record and/or emission potential. This section also contains continuous monitoring requirements to ensure the combustion temperature of fume incinerator I-1 (EU1.3) continuously meets the temperature limits set forth in the permit.

27. Monitoring for Insignificant Activities: As identified earlier in this Review Report, this facility has insignificant emissions units (IEUs) that include categorically insignificant activities and aggregate insignificant emissions, as defined in OAR 340-200-0020. For the most part, the standards that apply to IEUs are for opacity (20% limit) and particulate matter (0.1 gr/dscf limit). The Department does not consider it likely that IEUs could exceed an applicable emissions limit or standard because IEUs are generally equipment or activities that do not have any emission controls (e.g., small natural gas fired space heaters) and do not typically have visible emissions. Since there are no controls, no visible emissions, and the emissions are less than one ton per year, the Department does not believe that monitoring, recordkeeping, or reporting is necessary for assuring compliance with the standards.

PSEL monitoring:

28. The PSEL monitoring in this permit is divided into three sub-sections; monitoring required for the EU1 process units, the fuel burning EU2 equipment, and the EU3 through EU7 storage tanks. Emission factors and empirical formulas explicitly used to estimate the mass emissions for the purpose of determining compliance with respect to the PSEL are not, by themselves, enforceable limits. These emissions factors and relationships will be reviewed on an on-going basis, and they are subject to change if more accurate data become available - for example, based on data gathered during the life of the permit.
29. The permit emissions factors used to calculate the emissions from EU1 were derived from the source test results using the methods specified in 40 CFR 60.474. Source-specific empirical equations used to estimate the (PSEL) emissions from the storage tanks and the loading racks contain many variables that require explanation, so that mutual understanding exists between the permittee and the Department. The key variables and assumptions used to construct the permit PSEL monitoring are listed below for reference:
- a. As discussed in the EU/PCD ID section of this review report, the emissions from all existing and future EU4/EU5 storage tanks and the EU7 loading racks would be controlled by the EU1.3 incinerator (I-1). Each of the storage tanks, including EU3 and EU6, is also equipped with a filter that screens out the PM/PM₁₀ (condensable) emissions prior to incineration of VOC and H₂S. Furthermore, because not all of the storage tanks have been installed, the empirical equations must consider the number of tanks (n) that actually operate.
 - b. The following equation was used as the basis for calculating the VOC and PM₁₀ emissions from EU3 and EU5, when incinerator is operating:

$$E \text{ (lbs/mo)} = (EF) (FF) (n) (\%LEL/100) (28.32 \text{ L/ft}^3 / 454,000 \text{ mg/lb}) (60 \text{ min/hr}) (1 - CE \text{ CA}/10,000) (N) \quad \text{Eq.1}$$

Constants	EU3	EU5	Unit
VOC EF	45	45	mg/L
PM ₁₀ EF (28% VOC)	12.6	12.6	mg/L
FF	100	100	ft ³ /min/tank
n (number of tanks)	2	5	--
CE for PM	90	98	%
CE for VOC	0	98	%
CA	100	100	%
N (I-1 operating hours)	730	varies	hr/mo

The source tests revealed the portion of condensable VOC is approximately 28 percent of total VOC, and the PM₁₀ EF is therefore set equal to 28% of the VOC EF. Because the condensable PM is also VOC, this portion (28%) is actually being double counted. Plugging in the constant variables into the empirical equation 1 yields the following pollutant specific equations:

$$\begin{aligned}
 E_{EU3, \text{VOC}} &= 122.95 (\%LEL) (n) \\
 E_{EU3, \text{PM}_{10}} &= 3.44 (\%LEL) (n) \\
 E_{EU5, \text{VOC}} &= 3.37 \times 10^{-3} (\%LEL) (n) (N) \\
 E_{EU5, \text{PM}_{10}} &= 9.43 \times 10^{-4} (\%LEL) (n) (N)
 \end{aligned}$$

The %LEL of the tank vapor space is measured on a monthly basis using the organic vapor analyzer or other instrument capable of measuring the %LEL. The measurement from each tank grouped under the same emissions unit is then averaged, and the average for each EU identified is used to estimate the emissions from that EU. As noted in Table above (CE_{voc} = 0%), the VOC emissions from EU3 is not controlled by I-1.

- c. The following equation was used as the basis for calculating the CO and H₂S emissions from EU3 and EU5, when incinerator is operating:

$$E \text{ (lbs/mo)} = (EF) (FF) (n) (C) (0.028 \text{ m}^3/\text{ft}^3 / 454,000 \text{ mg/lb}) (60 \text{ min/hr}) (1 - CE \text{ CA}/10,000) (N) \quad \text{Eq.2}$$

Constants	EU3	EU5	Unit
CO EF	1.14	1.14	mg/m ³ /ppm
H ₂ S EF	1.39	1.39	mg/m ³ /ppm
FF	100	100	ft ³ /min/tank
n	2	5	--
CE for CO	0	98	%
CE for H ₂ S	0	98	%
CA	100	100	%
N	730	varies	hr/mo
C = a (%LEL) + b ; where a & b are pollutant specific constants.			ppm

The pollutant concentration C (ppm) is also measured based on the %LEL of the tank vapor space. Plugging in the constant variables into the empirical equation 2 yields the following pollutant specific equations:

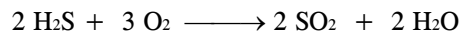
$$E_{EU3, CO} = 0.321 n C$$

$$E_{EU3, H2S} = 0.375 n C$$

$$E_{EU5, CO} = 8.44 \times 10^{-6} n C N$$

$$E_{EU5, H2S} = 1.03 \times 10^{-5} n C N$$

- d. In estimating the SO₂ emissions from EU5, assume 100% conversion of H₂S to SO₂:



The emission factor for SO₂ is then the same as the conversion ratio of 1.88 (2 MW_{SO₂} / 2 MW_{H₂S}) multiplied to the EF_{H₂S}: EF_{SO₂} = 1.88 * 1.39 ≈ 2.61 mg/m³/ppm. The modified version of equation 2 is then used to calculate the SO₂ emissions from EU5:

$$E \text{ (lbs/mo)} = (EF_{SO_2}) (FF) (n) (C) (0.028 \text{ m}^3/\text{ft}^3 / 454,000 \text{ mg/lb}) (60 \text{ min/hr}) (CE \text{ CA}/10,000) (N)$$

$$E_{EU5, SO_2} = 9.465 \times 10^{-4} n C N$$

- e. During the non-production period, when the incinerator is shut off, the EU4, EU5, and EU6 tanks will not be pumped (no working losses). Therefore, uncontrolled emissions from the storage tanks EU4, EU5, and EU6 consist of the tank breathing losses (L_B), which are calculated based on the EPA AP42 algorithms, modified to reflect the pollutant specific control efficiencies. Because the fans will be turned off when I-1 is down, the filters provide passive control of PM emissions from the storage tanks. No control is provided for VOC. The CO and H₂S emissions are approximately zero during the incinerator down time, and only the VOC emissions, of which 22% is PM (condensable), would occur:

$$E_{VOC} = 0.78 L_B$$

$$E_{PM10} = 0.22 (1 - 90\%/100\%) L_B = 0.022 L_B$$

The above equations are only applicable during the I-1 down time, and must compensate for the time when I-1 is operated during the month:

$$E_{VOC} = 0.78 (730 - N) L_B / 730$$

$$E_{PM10} = 0.022 (730 - N) L_B / 730$$

The AP42 algorithms are used as the basis for calculating monthly breathing loss (L_B) from each tank. Because the AP42 formula L_B calculates the annual emission, the monthly emission is simply the annual divided by 12, except the equation variables (P , K_C , etc.) are the monthly averages.

$$L_B = 2.26 \times 10^2 M_V [P/(P_A - P)]^{0.68} D^{1.73} H^{0.51} \Delta T^{0.5} F_P C K_C / 12$$

$$18.83 M_V [P/(P_A - P)]^{0.68} D^{1.73} H^{0.51} \Delta T^{0.5} F_P C K_C \quad (\text{lbs/mo})$$

where:

- M_V = average vapor molecular weight
- P = true vapor pressure at storage temperature
- P_A = average atmospheric pressure at tank location, psia; default = 14.7 psi
- D = tank diameter, feet
- H = average vapor space height
- ΔT = average temperature change, °F
- F_P = paint factor; see TABLE-1, Attachment 2
- C = adjustment factor for small tanks with $D < 30$ feet
 $= 0.0771 (D) - 0.0013 (D^2) - 0.1334$; otherwise $C = 1$ for $D \geq 30$.
- K_C = product factor; for crude oil, $K_C = 0.65$. For all other organic liquids, $K_C = 1.0$.

- f. As with EU4 and EU6, emission factors for EU1 already include the (controlled) emissions from the EU7 loading racks when I-1 is operated. However, unlike storage tank emissions, the EU7 capture efficiency is not 100%, and the monitoring methods must be developed to account for the uncaptured emissions when I-1 is operated. The emission factors listed below are based on source test results:

	CE (%)	CA (%)	EF (lbs/truck)	
			@ 480°F, oxidized asphalt	@ 375°F, paving asphalt without additive
PM10	90	80	5	0.812
VOC	0	80	17.73	2.88

- i. The following equation is used as the basis for calculating the uncaptured PM_{10} and VOC emissions when I-1 is on:

$$E (\text{lbs/mo}) = P * EF * (1 - CA/100)$$

- ii. The following equation is used as the basis for calculating the PM_{10} and VOC emissions when I-1 is turned off:

$$E (\text{lbs/mo}) = P * EF * (1 - CE CA/10,000)$$

- g. Equations similar to the equation 2, along with the constants provided below, are used as the basis for calculating the CO and H₂S emissions from EU7:

EU7 Constants		Unit
EF _{CO}	1.14	mg/m ³ /ppm
EF _{H₂S}	1.39	mg/m ³ /ppm
FF	600	ft ³ /min
CE _{CO}	0	%
CE _{H₂S}	0	%
CA	80	%
C _{CO} @ 480°F, oxidized asphalt	8184	ppm
C _{CO} @ 375°F, paving asphalt	500	ppm
C _{H₂S} @ 480°F, oxidized asphalt	1047	ppm
C _{H₂S} @ 375°F, paving asphalt	500	ppm
P (monthly production)	varies	trucks/mo

- i. The following equation is used as the basis for calculating the uncaptured PM₁₀ and VOC emissions when I-1 is on:

$$E \text{ (lbs/mo)} = (EF) (FF) (C) (0.028 \text{ m}^3/\text{ft}^3 / 454,000 \text{ mg/lb}) (1 - CA/100) (P) (9500 \text{ gal/truck} / 300 \text{ gal/min})$$

$$E_{CO, \text{Oxidized}} = 2.187 * P$$

$$E_{CO, \text{Paving}} = 0.134 * P$$

$$E_{H_2S, \text{Oxidized}} = 0.341 * P$$

$$E_{H_2S, \text{Paving}} = 0.163 * P$$

- ii. The following equation is used as the basis for calculating the PM₁₀ and VOC emissions when I-1 is turned off:

$$E \text{ (lbs/mo)} = (EF) (FF) (C) (0.028 \text{ m}^3/\text{ft}^3 / 454,000 \text{ mg/lb}) (1 - CE CA/10,000) (P) (9500 \text{ gal/truck} / 300 \text{ gal/min})$$

$$E_{CO, \text{Oxidized}} = 10.933 * P$$

$$E_{CO, \text{Paving}} = 0.668 * P$$

$$E_{H_2S, \text{Oxidized}} = 1.705 * P$$

$$E_{H_2S, \text{Paving}} = 0.814 * P$$

TEST METHODS AND PROCEDURES

30. This section, titled "Test Methods and Procedures", is provided so that the permittee and Department will know what test methods should be used to measure pollutant emissions in the event that testing is conducted for any reason. This section does not by itself require the permittee to conduct any more testing than was previously included in the permit. Although the permit may not require testing because other routine monitoring is used to determine compliance, the Department and EPA always have the authority to require testing if deemed necessary to determine compliance with an emission limit or standard. In addition, the permittee may elect to voluntarily conduct testing to confirm the compliance status. In either

case, the methods to be used for testing in the event that testing is conducted are included in the permit. This is true for SIP as well as NSPS emission limits and standards.

RECORDKEEPING REQUIREMENTS

31. Recordkeeping requirements in this permit are drafted pursuant to OAR 340-028-2130(3)(b). The records of all monitoring specified in the Oregon Title-V Operating Permit 34-2681 must be kept at the plant site for at least 5 years. All records necessary to determine compliance with any permit condition shall be made available to the DEQ/EPA inspectors upon request.

REPORTING REQUIREMENTS

32. Reporting requirements in this permit are drafted pursuant to OAR 340-028-2130(3)(c). In addition to the monthly reports, the permittee is required to submit reports to the Department twice per year. The semi-annual reports are for certifying compliance with the permit requirements. The annual report consists of the second semi-annual compliance certification; in addition to the product throughputs, and other relevant data needed to determine compliance with the annual PSEL.

GENERAL BACKGROUND INFORMATION

33. Other permits issued or required by the Department of Environmental Quality for this source include the NPDES permits 100J, 500J, and 1300J. The Owens Corning facility is considered a conditionally exempt hazardous waste generator.
34. A Land Use Compatibility Statement signed by the City of Portland on March 10, 1995 granted approval of the facility operations.
35. The source is located in a maintenance area for ozone and Carbon Monoxide (CO). The area is in attainment for all other criteria pollutants. The facility is a minor (< 100 tons/yr) source of Volatile Organic Compounds (ozone precursor) and a major (> 100 tons/yr) source of CO. Except for CO and SO₂ emissions under OS#1, all criteria pollutants are emitted at a level below the major source threshold of 100 tons/yr.

COMPLIANCE HISTORY

36. The facility inspections conducted by the Department staff on July 17, 2005 determined the Owens Corning facility was operating in compliance with all of the permit requirements.

SUMMARY/PUBLIC NOTICE

37. Pursuant to OAR 340-218-0210, the proposed permit renewal requires a category III permit actions and public notice is required. The draft permit will be placed on public notice from January 24, 2007 through February 28, 2007, 5pm, to allow any interested public to submit written comments. The Department will hold a public hearing if requested by ten or more individuals or one person representing a group of ten or more individuals. After the comment period, and the hearing if deemed appropriate, the Department will review all comments received and revise the (draft) permit as necessary. A proposed permit will then be sent to EPA for a 45-day review period. The Department may request EPA to expedite their review to 5 days if no substantive or adverse comments were received during the comment period. In any event, the public will have 105 days (45 day EPA review period plus 60 days) from the date the proposed permit is sent to EPA to appeal the permit with EPA. The permit will be issued following EPA's review.

gdyT263067R1

LIST OF COMMON ABBREVIATIONS USED IN AIR CONTAMINANT DISCHARGE PERMITS

A	annual	PM	particulate matter
ACDP	Air Contaminant Discharge Permit	PM ₁₀	particulate matter less than 10 microns in size
ASTM	American Society for Testing and Materials	ppm	part per million
bbl	barrel (42 gal)	ppmv	part per million by volume
calendar year	The 12 month period beginning January 1 st and ending December 31 st	PSD	Prevention of Significant Deterioration
CFR	Code of Federal Regulations	PSEL	Plant Site Emission Limit
CO	carbon monoxide	Q	quarterly
date	mm/dd/yy	R	required
DEQ	Oregon Department of Environmental Quality	RACT	Reasonably Available Control Technology
dscf	dry standard cubic foot	S	semi-annual
EPA	US Environmental Protection Agency	scf	standard cubic foot
FCAA	Federal Clean Air Act	SERP	Source Emission Reduction Plan
gal	gallon(s)	SIP	State Implementation Plan
gr/dscf	grains per dry standard cubic foot	SO ₂	sulfur dioxide
HAP	Hazardous Air Pollutant as defined by OAR 340-244-0040	VE	visible emissions
ID	identification number	VOC	volatile organic compound
I&M	inspection and maintenance	year	A period consisting of any 12 consecutive calendar months
lb	pound(s)		
M	monthly		
MMBtu	million British thermal units		
N	not required		
NESHAP	National Emissions Standards for Hazardous Air Pollutants		
NO _x	nitrogen oxides		
NSPS	New Source Performance Standard		
NSR	New Source Review		
O ₂	oxygen		
OAR	Oregon Administrative Rules		
ORS	Oregon Revised Statutes		
O&M	operation and maintenance		
Pb	lead		
PCD	pollution control device		

Facility Name: Owens Corning Linnton Trumbull Asphalt

Permit Number: 26-3067

1. Emissions Point	Production Rates		4. Pollutant	Emissions Factors			Emissions	
	2. Short-term (Specify units)	3. Annual (Specify units)		5. Short-term	6. Long-term	7. Reference(s)	8. Short-term (Specify units)	9. Annual (tons/year)
EU1.4	8.5 tons/hr	53,571 tons/yr	PM ₁₀	0.075 lb/ton	0.075 lb/ton	Source Test	334.82 lbs/mth	2.009
			VOC	0.05 lb/ton	0.05 lb/ton	Source Test	223.21 lbs/mth	1.339
			CO	1.00 lb/ton	1.00 lb/ton	Source Test	4,464.29 lbs/mth	26.786
			H ₂ S	0.01 lb/ton	0.01 lb/ton	Source Test	44.64 lbs/mth	0.268
			SO _x	0.60 lb/ton	0.60 lb/ton	Source Test	2,678.58 lbs/mth	16.072
			NO _x	0.20 lb/ton	0.20 lb/ton	Source Test	892.86 lbs/mth	5.357
EU2.1	730 hrs/mth	8760 hrs/yr	PM ₁₀	2.5 lb/MMcf	2.5 lb/MMcf	Oregon-DEQ	8.02 lbs/mth	0.048
			VOC	5.5 lb/MMcf	5.5 lb/MMcf	AP-42	17.65 lbs/mth	0.106
			CO	84 lb/MMcf	84 lb/MMcf	AP-42	269.57 lbs/mth	1.617
			SO _x	2.6 lb/MMcf	2.6 lb/MMcf	NW Natural Gas	8.34 lbs/mth	0.050
			NO _x	100 lb/MMcf	100 lb/MMcf	AP-42	320.91 lbs/mth	1.925
EU2.2	0 hrs/mth	0 hrs/yr	REMOVED FROM SERVICE					
EU2.3	730 hrs/mth	8760 hrs/yr	PM ₁₀	2.5 lb/MMcf	2.5 lb/MMcf	Oregon DEQ	110.44 lbs/mth	0.125
			VOC	5.5 lb/MMcf	5.5 lb/MMcf	AP-42	27.8 lbs/mth	0.167
			CO	84 lb/MMcf	84 lb/MMcf	AP-42	424.57 lbs/mth	2.548
			SO _x	2.6 lb/MMcf	2.6 lb/MMcf	NW Natural Gas	5,384.17 lbs/mth	2.773
			NO _x	100 lb/MMcf	100 lb/MMcf	AP-42	1,168.81 lbs/mth	3.365

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
EU1.1	77,143 tons/yr	HCl ¹	8.37E-03 lb/ton	Source Test	3.23E-01
	19,286 tons/yr	HCl ²	2.94E-01 lb/ton	Source Test	2.84E+00
	96,429 tons/yr	Xylene	2.05E-04 lb/ton	Source Test	9.89E-03
	96,429 tons/yr	Benzene	3.00E-03 lb/ton	Source Test	1.45E-01
	96,429 tons/yr	Toluene	4.07E-04 lb/ton	Source Test	1.96E-02
	96,429 tons/yr	Ethyl Benzene	1.48E-02 lb/ton	Source Test	7.16E-01
	96,429 tons/yr	methyl chloride	9.53E-04 lb/ton	Source Test	4.59E-02
	96,429 tons/yr	vinyl chloride	1.17E-04 lb/ton	Source Test	5.64E-03
	96,429 tons/yr	ethyl chloride	9.25E-05 lb/ton	Source Test	4.46E-03
	96,429 tons/yr	methylene chloride	1.62E-03 lb/ton	Source Test	7.80E-02
	96,429 tons/yr	chloroform	1.41E-04 lb/ton	Source Test	6.81E-03
	96,429 tons/yr	Di-n-butylphthalate	3.55E-06 lb/ton	Source Test	1.71E-04
	96,429 tons/yr	Dibenzofuran	4.56E-05 lb/ton	Source Test	2.20E-03
	96,429 tons/yr	bis(2-ethylhexyl) phthalate	1.15E-05 lb/ton	Source Test	5.53E-04
	96,429 tons/yr	isophorone	3.56E-06 lb/ton	Source Test	1.72E-04
	96,429 tons/yr	4-nitrophenol	1.93E-05 lb/ton	Source Test	9.31E-04
	96,429 tons/yr	Phenol	1.71E-05 lb/ton	Source Test	8.24E-04
	96,429 tons/yr	o-cresol	2.96E-06 lb/ton	Source Test	1.43E-04
	96,429 tons/yr	p-cresol	1.04E-05 lb/ton	Source Test	5.03E-04
	96,429 tons/yr	POM's	2.52E-04 lb/ton	Source Test	1.21E-02
	96,429 tons/yr	Antimony	1.22E-06 lb/ton	Source Test	5.88E-05
	96,429 tons/yr	Arsenic	3.37E-06 lb/ton	Source Test	1.62E-04
	96,429 tons/yr	Beryllium	1.01E-08 lb/ton	Source Test	4.89E-07
	96,429 tons/yr	Cadmium	6.89E-07 lb/ton	Source Test	3.32E-05
	96,429 tons/yr	Chromium	3.87E-05 lb/ton	Source Test	1.87E-03

1. Emission factor for Asphalt blowing process operated under operating scenario #1 when a catalyst is not used.

2. Emission factor for Asphalt blowing process operated under operating scenario #2 when a catalyst is used.

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
EU1.1 (cont.)	96,429 tons/yr	Cobalt	1.07E-05 lb/ton	Source Test	5.15E-04
	96,429 tons/yr	Manganese	2.88E-04 lb/ton	Source Test	1.39E-02
	96,429 tons/yr	Nickel	3.38E-04 lb/ton	Source Test	1.63E-02
	96,429 tons/yr	Phosphorous	4.88E-06 lb/ton	Source Test	2.35E-04
	96,429 tons/yr	Selenium	2.95E-06 lb/ton	Source Test	1.42E-04
EU1.2	77,143 tons/yr	HCl ¹	8.37E-03 lb/ton	Source Test	3.23E-01
	19,286 tons/yr	HCl ²	2.94E-01 lb/ton	Source Test	2.84E+00
	96,429 tons/yr	Xylene	2.05E-04 lb/ton	Source Test	9.89E-03
	96,429 tons/yr	Benzene	3.00E-03 lb/ton	Source Test	1.45E-01
	96,429 tons/yr	Toluene	4.07E-04 lb/ton	Source Test	1.96E-02
	96,429 tons/yr	Ethyl Benzene	1.48E-02 lb/ton	Source Test	7.16E-01
	96,429 tons/yr	methyl chloride	9.53E-04 lb/ton	Source Test	4.59E-02
	96,429 tons/yr	vinyl chloride	1.17E-04 lb/ton	Source Test	5.64E-03
	96,429 tons/yr	ethyl chloride	9.25E-05 lb/ton	Source Test	4.46E-03
	96,429 tons/yr	methylene chloride	1.62E-03 lb/ton	Source Test	7.80E-02
	96,429 tons/yr	chloroform	1.41E-04 lb/ton	Source Test	6.81E-03
	96,429 tons/yr	Di-n-butylphthalate	3.55E-06 lb/ton	Source Test	1.71E-04
	96,429 tons/yr	Dibenzofuran	4.56E-05 lb/ton	Source Test	2.20E-03
	96,429 tons/yr	bis(2-ethylhexyl) phthalate	1.15E-05 lb/ton	Source Test	5.53E-04
	96,429 tons/yr	isophorone	3.56E-06 lb/ton	Source Test	1.72E-04
	96,429 tons/yr	4-nitrophenol	1.93E-05 lb/ton	Source Test	9.31E-04
	96,429 tons/yr	Phenol	1.71E-05 lb/ton	Source Test	8.24E-04
	96,429 tons/yr	o-cresol	2.96E-06 lb/ton	Source Test	1.43E-04
	96,429 tons/yr	p-cresol	1.04E-05 lb/ton	Source Test	5.03E-04
	96,429 tons/yr	POM's	2.52E-04 lb/ton	Source Test	1.21E-02
	96,429 tons/yr	Antimony	1.22E-06 lb/ton	Source Test	5.88E-05

1. Emission factor for Asphalt blowing process operated under operating scenario #1 when a catalyst is not used.

2. Emission factor for Asphalt blowing process operated under operating scenario #2 when a catalyst is used.

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
EU1.2 (cont.)	96,429 tons/yr	Arsenic	3.37E-06 lb/ton	Source Test	1.62E-04
	96,429 tons/yr	Beryllium	1.01E-08 lb/ton	Source Test	4.89E-07
	96,429 tons/yr	Cadmium	6.89E-07 lb/ton	Source Test	3.32E-05
	96,429 tons/yr	Chromium	3.87E-05 lb/ton	Source Test	1.87E-03
	96,429 tons/yr	Cobalt	1.07E-05 lb/ton	Source Test	5.15E-04
	96,429 tons/yr	Manganese	2.88E-04 lb/ton	Source Test	1.39E-02
	96,429 tons/yr	Nickel	3.38E-04 lb/ton	Source Test	1.63E-02
	96,429 tons/yr	Phosphorous	4.88E-06 lb/ton	Source Test	2.35E-04
	96,429 tons/yr	Selenium	2.95E-06 lb/ton	Source Test	1.42E-04
EU1.3	42,857 tons/yr	HCl ¹	8.37E-03 lb/ton	Source Test	1.79E-01
	10,714 tons/yr	HCl ²	2.94E-01 lb/ton	Source Test	1.58E+00
	53,571 tons/yr	Xylene	2.05E-04 lb/ton	Source Test	5.50E-03
	53,571 tons/yr	Benzene	3.00E-03 lb/ton	Source Test	8.04E-02
	53,571 tons/yr	Toluene	4.07E-04 lb/ton	Source Test	1.09E-02
	53,571 tons/yr	Ethyl Benzene	1.48E-02 lb/ton	Source Test	3.98E-01
	53,571 tons/yr	methyl chloride	9.53E-04 lb/ton	Source Test	2.55E-02
	53,571 tons/yr	vinyl chloride	1.17E-04 lb/ton	Source Test	3.13E-03
	53,571 tons/yr	ethyl chloride	9.25E-05 lb/ton	Source Test	2.48E-03
	53,571 tons/yr	methylene chloride	1.62E-03 lb/ton	Source Test	4.33E-02
	53,571 tons/yr	chloroform	1.41E-04 lb/ton	Source Test	3.79E-03
	53,571 tons/yr	Di-n-butylphthalate	3.55E-06 lb/ton	Source Test	9.50E-05
	53,571 tons/yr	Dibenzofuran	4.56E-05 lb/ton	Source Test	1.22E-03
	53,571 tons/yr	bis(2-ethylhexyl) phthalate	1.15E-05 lb/ton	Source Test	3.07E-04
	53,571 tons/yr	isophorone	3.56E-06 lb/ton	Source Test	9.53E-05
	53,571 tons/yr	4-nitrophenol	1.93E-05 lb/ton	Source Test	5.17E-04

1. Emission factor for Asphalt blowing process operated under operating scenario #1 when a catalyst is not used.

2. Emission factor for Asphalt blowing process operated under operating scenario #2 when a catalyst is used.

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
EU1.3 (cont.)	53,571 tons/yr	Phenol	1.71E-05 lb/ton	Source Test	4.58E-04
	53,571 tons/yr	o-cresol	2.96E-06 lb/ton	Source Test	7.92E-05
	53,571 tons/yr	p-cresol	1.04E-05 lb/ton	Source Test	2.79E-04
	53,571 tons/yr	POM's	2.52E-04 lb/ton	Source Test	6.75E-03
	53,571 tons/yr	Antimony	1.22E-06 lb/ton	Source Test	3.27E-05
	53,571 tons/yr	Arsenic	3.37E-06 lb/ton	Source Test	9.01E-05
	53,571 tons/yr	Beryllium	1.01E-08 lb/ton	Source Test	2.72E-07
	53,571 tons/yr	Cadmium	6.89E-07 lb/ton	Source Test	1.85E-05
	53,571 tons/yr	Chromium	3.87E-05 lb/ton	Source Test	1.04E-03
	53,571 tons/yr	Cobalt	1.07E-05 lb/ton	Source Test	2.86E-04
	53,571 tons/yr	Manganese	2.88E-04 lb/ton	Source Test	7.71E-03
	53,571 tons/yr	Nickel	3.38E-04 lb/ton	Source Test	9.06E-03
	53,571 tons/yr	Phosphorous	4.88E-06 lb/ton	Source Test	1.31E-04
	53,571 tons/yr	Selenium	2.95E-06 lb/ton	Source Test	7.89E-05
EU1.4	42,857 tons/yr	HCl ¹	8.37E-03 lb/ton	Source Test	1.79E-01
	10,714 tons/yr	HCl ²	2.94E-01 lb/ton	Source Test	1.58E+00
	53,571 tons/yr	Xylene	2.05E-04 lb/ton	Source Test	5.50E-03
	53,571 tons/yr	Benzene	3.00E-03 lb/ton	Source Test	8.04E-02
	53,571 tons/yr	Toluene	4.07E-04 lb/ton	Source Test	1.09E-02
	53,571 tons/yr	Ethyl Benzene	1.48E-02 lb/ton	Source Test	3.98E-01
	53,571 tons/yr	methyl chloride	9.53E-04 lb/ton	Source Test	2.55E-02
	53,571 tons/yr	vinyl chloride	1.17E-04 lb/ton	Source Test	3.13E-03
	53,571 tons/yr	ethyl chloride	9.25E-05 lb/ton	Source Test	2.48E-03
	53,571 tons/yr	methylene chloride	1.62E-03 lb/ton	Source Test	4.33E-02
	53,571 tons/yr	chloroform	1.41E-04 lb/ton	Source Test	3.79E-03

1. Emission factor for Asphalt blowing process operated under operating scenario #1 when a catalyst is not used.

2. Emission factor for Asphalt blowing process operated under operating scenario #2 when a catalyst is used.

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
EU1.4 (cont.)	53,571 tons/yr	Di-n-butylphthalate	3.55E-06 lb/ton	Source Test	9.50E-05
	53,571 tons/yr	Dibenzofuran	4.56E-05 lb/ton	Source Test	1.22E-03
	53,571 tons/yr	bis(2-ethylhexyl) phthalate	1.15E-05 lb/ton	Source Test	3.07E-04
	53,571 tons/yr	isophorone	3.56E-06 lb/ton	Source Test	9.53E-05
	53,571 tons/yr	4-nitrophenol	1.93E-05 lb/ton	Source Test	5.17E-04
	53,571 tons/yr	Phenol	1.71E-05 lb/ton	Source Test	4.58E-04
	53,571 tons/yr	o-cresol	2.96E-06 lb/ton	Source Test	7.92E-05
	53,571 tons/yr	p-cresol	1.04E-05 lb/ton	Source Test	2.79E-04
	53,571 tons/yr	POM's	2.52E-04 lb/ton	Source Test	6.75E-03
	53,571 tons/yr	Antimony	1.22E-06 lb/ton	Source Test	3.27E-05
	53,571 tons/yr	Arsenic	3.37E-06 lb/ton	Source Test	9.01E-05
	53,571 tons/yr	Beryllium	1.01E-08 lb/ton	Source Test	2.72E-07
	53,571 tons/yr	Cadmium	6.89E-07 lb/ton	Source Test	1.85E-05
	53,571 tons/yr	Chromium	3.87E-05 lb/ton	Source Test	1.04E-03
	53,571 tons/yr	Cobalt	1.07E-05 lb/ton	Source Test	2.86E-04
	53,571 tons/yr	Manganese	2.88E-04 lb/ton	Source Test	7.71E-03
	53,571 tons/yr	Nickel	3.38E-04 lb/ton	Source Test	9.06E-03
	53,571 tons/yr	Phosphorous	4.88E-06 lb/ton	Source Test	1.31E-04
	53,571 tons/yr	Selenium	2.95E-06 lb/ton	Source Test	7.89E-05
EU1.5	No HAP Emissions				
EU2.1	No HAP Emissions				
EU2.2	Removed from service				
EU2.3	54,327 gal/yr	Arsenic	5.92E-04 lb/Mgal	AP-42	1.61E-05
	54,327 gal/yr	Beryllium	3.53E-04 lb/Mgal	AP-42	9.58E-06
	54,327 gal/yr	Cadmium	1.55E-03 lb/Mgal	AP-42	4.21E-05

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
EU2.3 (cont)	54,327 gal/yr	Chromium	9.45E-03 lb/Mgal	AP-42	2.57E-04
	54,327 gal/yr	Manganese	1.97E-03 lb/Mgal	AP-42	5.36E-05
	54,327 gal/yr	Mercury	4.23E-04 lb/Mgal	AP-42	1.15E-05
	54,327 gal/yr	Nickel	2.54E-03 lb/Mgal	AP-42	6.89E-05
EU2.4	43,241 gal/yr	Arsenic	5.92E-04 lb/Mgal	AP-42	1.28E-05
	43,241 gal/yr	Beryllium	3.53E-04 lb/Mgal	AP-42	7.62E-06
	43,241 gal/yr	Cadmium	1.55E-03 lb/Mgal	AP-42	3.35E-05
	54,327 gal/yr	Chromium	9.45E-03 lb/Mgal	AP-42	2.04E-04
	43,241 gal/yr	Manganese	1.97E-03 lb/Mgal	AP-42	4.27E-05
	43,241 gal/yr	Mercury	4.23E-04 lb/Mgal	AP-42	9.15E-06
	43,241 gal/yr	Nickel	2.54E-03 lb/Mgal	AP-42	5.49E-05
EU3.2	33,333 ton/yr	Butadiene		Mat. Balance	3.33E-03
	33,333 ton/yr	Styrene		Mat. Balance	5.33E-02
	33,333 ton/yr	Vinyl Acetate		Mat. Balance	2.00E-01
EU5.1	33,333 ton/yr	Butadiene		Mat. Balance	3.33E-03
	33,333 ton/yr	Styrene		Mat. Balance	5.33E-02
	33,333 ton/yr	Vinyl Acetate		Mat. Balance	2.00E-01
EU5.4	33,333 ton/yr	Butadiene		Mat. Balance	3.33E-03
	33,333 ton/yr	Styrene		Mat. Balance	5.33E-02
	33,333 ton/yr	Vinyl Acetate		Mat. Balance	2.00E-01
EU7.2	50,000 ton/yr	Diethanolamine	1.54E-03 lb/ton	AP-42	3.50E-02
EU7.4	50,000 ton/yr	Diethanolamine	1.54E-03 lb/ton	AP-42	3.50E-02

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
TOTALS		4-nitrophenol			2.90E-03
		Antimony			1.83E-04
		Arsenic			5.34E-04
		Benzene			4.50E-01
		Beryllium			1.87E-05
		bis(2-ethylhexyl) phthalate			1.72E-03
		Butadiene			1.00E-02
		Cadmium			1.79E-04
		chloroform			2.12E-02
		Chromium			6.26E-03
		Cobalt			1.60E-03
		Dibenzofuran			6.84E-03
		Diethanolamine			7.00E-02
		Di-n-butylphthalate			5.32E-04
		Ethyl Benzene			2.23E+00
		ethyl chloride			1.39E-02
		HCl (ferric)			8.83E+00
		HCl (non-ferric)			1.00E+00
		isophorone			5.34E-04
		Manganese			4.33E-02
		methyl chloride			1.43E-01
		methylene chloride			2.43E-01
		Nickel			5.07E-02
		o-cresol			4.44E-04
		p-cresol			1.56E-03
		Phenol			2.56E-03

Facility Name: Owens Corning Linnton Trumbull Asphalt Permit Number: 26-3067

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF Reference	6. Annual Emissions (tons/yr)
		Phosphorous			7.32E-04
		POM's			3.78E-02
		Selenium			4.42E-04
		Styrene			1.60E-01
		Toluene			6.11E-02
		Vinyl Acetate			6.00E-01
		vinyl chloride			1.76E-02
		Xylene			3.08E-02
		Total Combined HAPs			1.40E+01